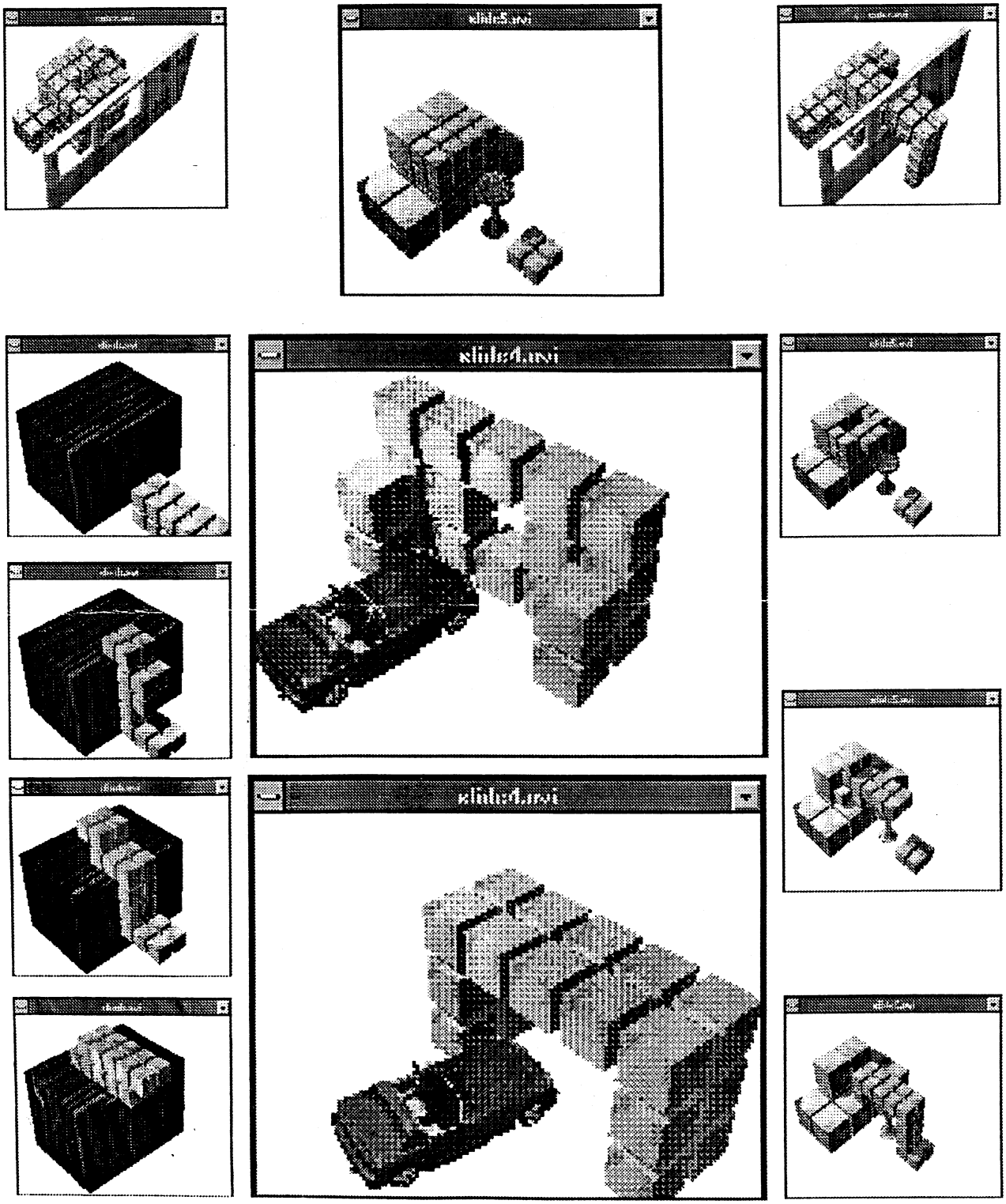
Shape Changing Robots



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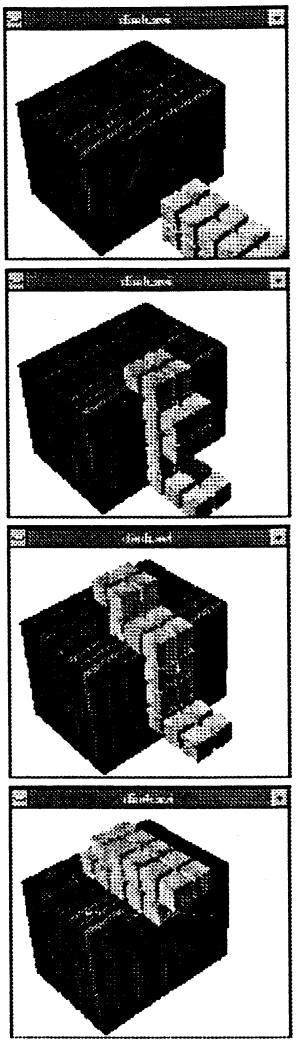
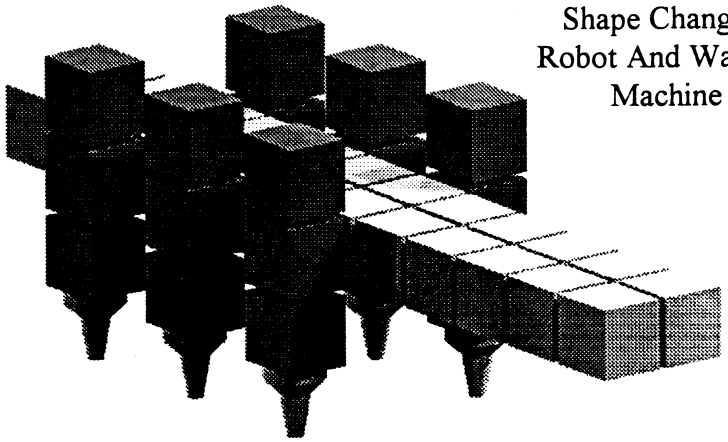


Animation of a crawling machine that is also a wall climbing robot capable of immense stealth operations such as sneaking into buildings.

The robots can climb heights several times their own height, climbing past rocky terrain, trees, and bomb debris.

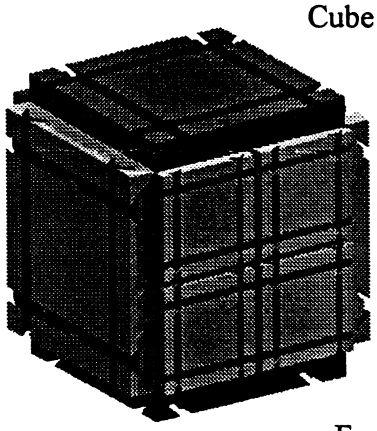
Each robotic cube can also be replaced and/or discarded by other robotic cubes if they develop a fault allowing this machine to repair itself on the fly! Smaller tool carrying robots can be used to access areas which conventional robots cannot reach.

Shape Changing Robot And Walking Machine

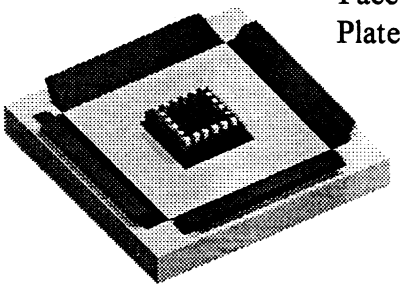


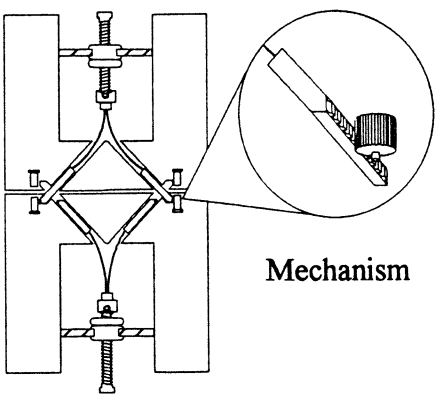
This shape changing robot is using studs fitted to robotic cubes to allow the machine to walk on very difficult terrain. In later pages, you will see how a crawling machine as illustrated on the left panels can transform into a walking machine above!!

Robotic Cube



Face Plate





Mechanism

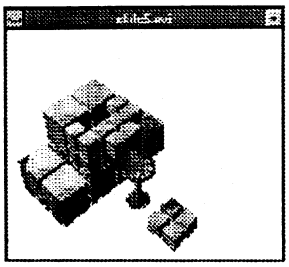
So what is Shape Changing Robot? A shape changing robot is a robot built of identical robotic cubes. A picture of what a robotic cube might look like is shown on the left.

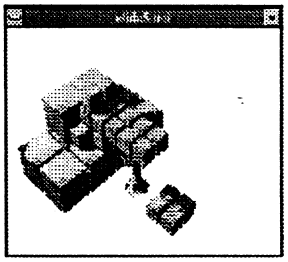
The robotic cube is simply a motorized brick that can move under computer control. The bricks can lock together to make complex shapes. They can also pick up other objects including themselves or smaller version of themselves using face plates quarter size of normal size as illustrated on the robotic cube.

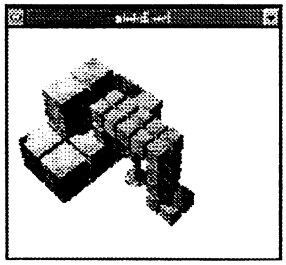
Each cube face has four slots that allow motorized wedges to pop up from its surface at a 45 degree angle as illustrated in the of the face plate.

These wedges allow the cubes to lock to each other and also move them using internal mechanism. Each face also has an electrical contact pad at its centre allowing power and data communications.

Any tool can be picked up if they have compatible slots. The tools can be operated if they have compatible contact pads. Robotic cubes ranging in size from sub millimetre to several metres possible allowing them to pick up and operate almost all known engineering tools with a single fractal robot!!



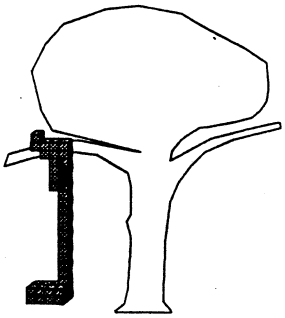


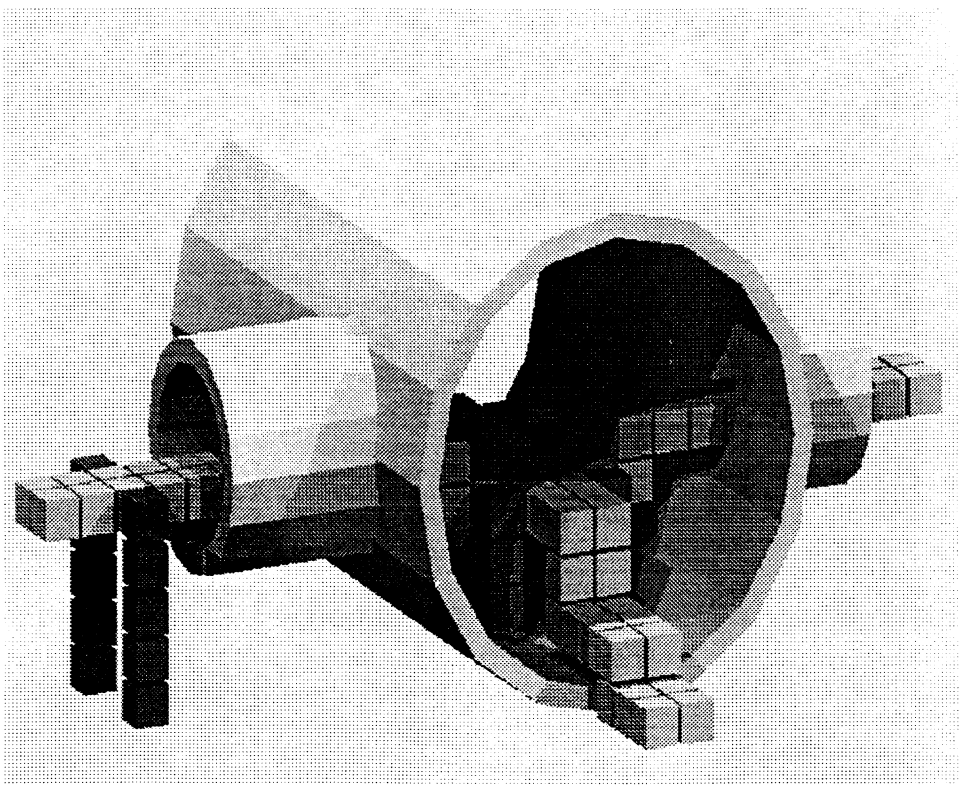


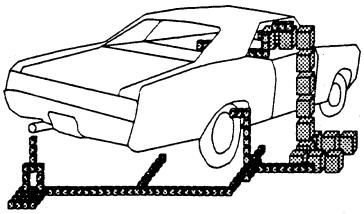
Shape changing robots are fractal robots. Small and large robotic cubes can be mixed in the same machine seamlessly to yield a fractal machine.

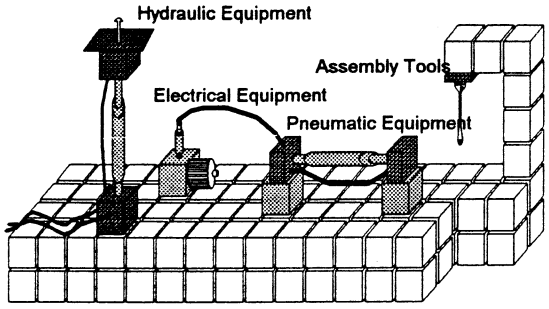
This fractal machine can be used to enter pipes and travel down narrow tubes. The above animation shows how a fractal 'arm' jumps over a fountain.

Such robots can be used in nuclear accident control and decomissioning work at costs that are a fraction of standard robots or robotics technology.







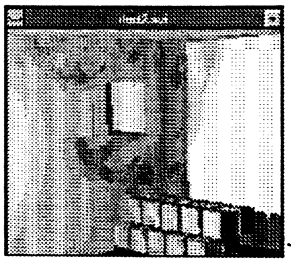


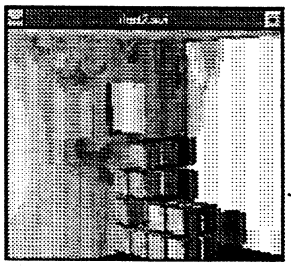
Tool carrying fractal shape changing robots can enter a vehicle and 100% assemble all its components which is unlike anything ever seen before.

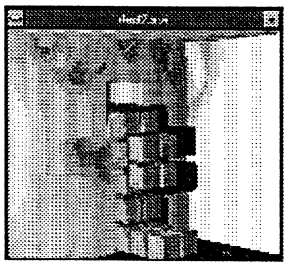
Shape changing robots can integrate almost any tool into its mechanisms. Because the robot is fractal, there will always be a size of robotic cube that matches the size of the tool whether that tool is sub millimetre in size or several metres in size. A factory floor can be re-tooled in a matter of hours using this technology. Even the cable interconnects can be sorted out by the robot as it can pick up any cable using fractal cubes, move it through any complex contour and re-connect provided that the cables are pre-terminated. (It could terminate the cable if it had a tool instead.)

There is no size limit to how small shape changing robots have to be. 1mm robots are feasible today using glass extrusion technology. These robots are micro-technology and nano technology compatible robots. As you go down the scales, the breakage rate is so much higher that self repair as discussed before is vital to proper functioning at those scales which this robot offers using computer software control algorithms that work at all geometric scales. 1mm robots can be used to perform delicate human surgery or 100% assemble palm size VCR recorders at a fraction of conventional manufacturing cost.

Fractal shape changing robots have much higher dexterity than conventional robots or humans. Since they are also self repairing, humanity will have a lot to think about in the future when these robots finally arrive.







The animations on the left show how a stealth robot walks up to a duct and crawls inside it. It can climb several times its own height by deforming into a vertical stream before squeezing through the narrow duct.

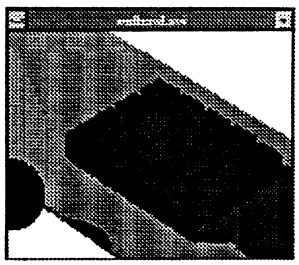
The machine has no legs as such and yet it can walk, crawl and do thing most walking machines, let alone humans find impossible to accomplish!!

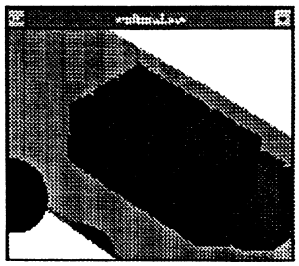
Dummy plates with 45 degree slots cut into them bolted to the walls and ceiling makes the building shape changing robot compatible. Such buildings allow the robot to walk up walls and ceilings to perform previously impossible taks such as changing the light bulbs.

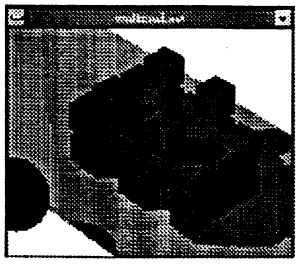
The series of animation panels on the right illustrate how a crawling machine transforms into a walking machine.

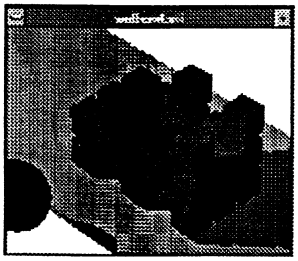
Walking machines are useful in crossing difficult uneven terrain The machine as before does not really have any legs and yet it can sythesise them as and when needed!

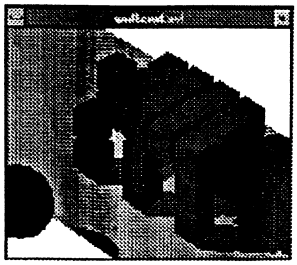
These robots will some day be employed to clear up mine fields as they are extremely cheap to manufacture. E.g. £30,000 for the robot on the right!

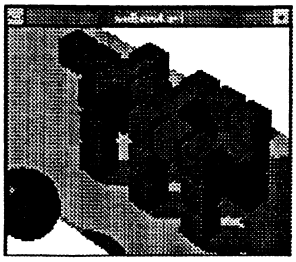


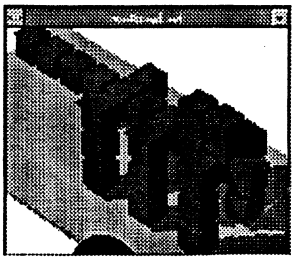












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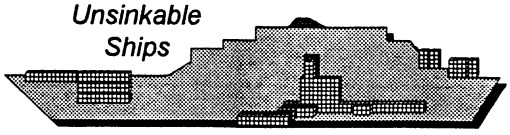

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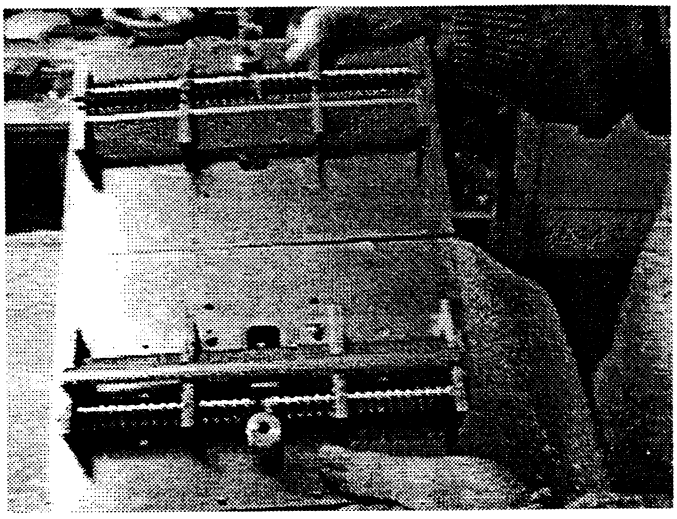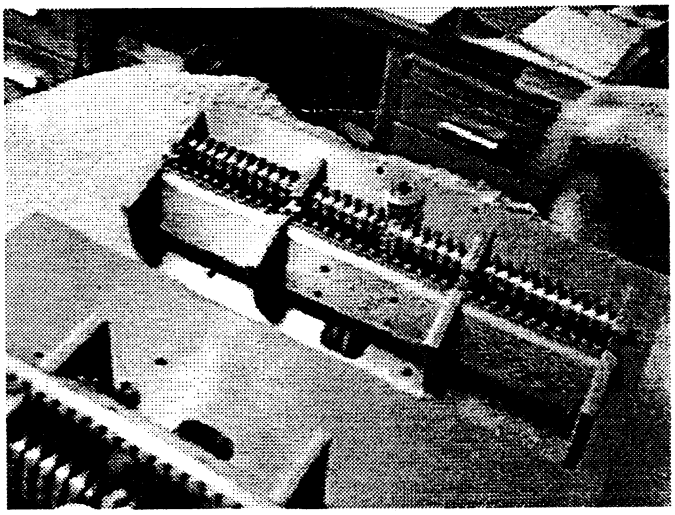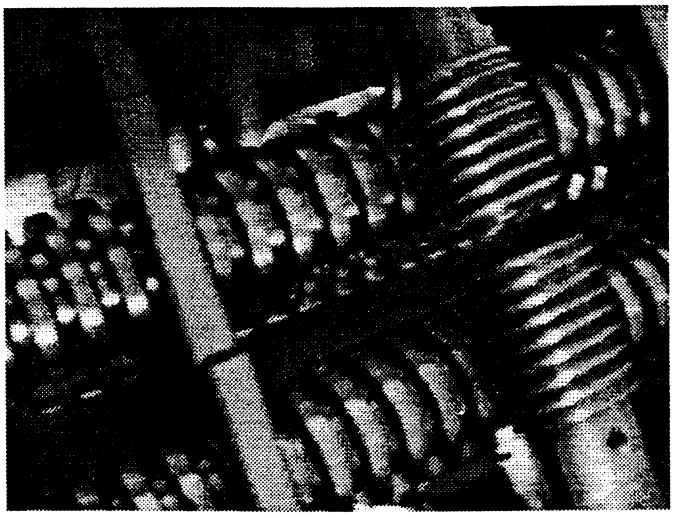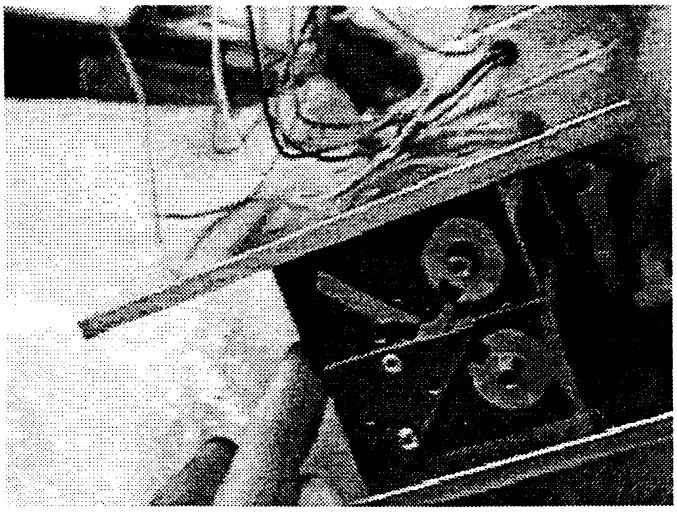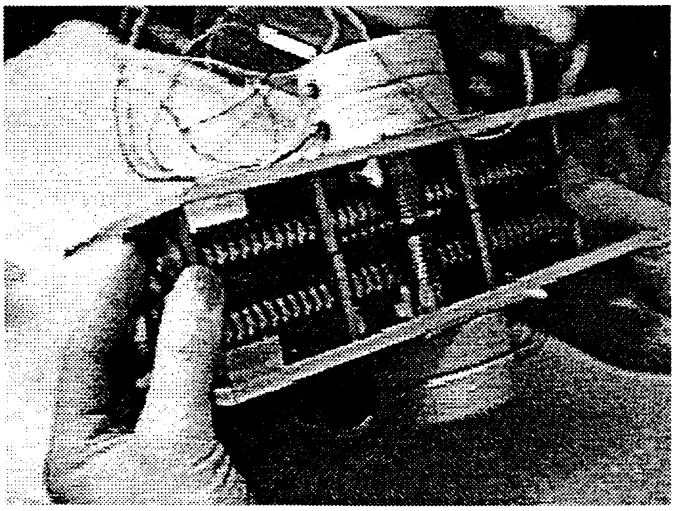
SHAPE CHANGING ROBOT
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